UNIT 15 CAPITAL FORMATION IN INDIAN AGRICULTURE

Structure

15.0 OBJECTIVES

After going through this unit, you will be able to:

- distinguish between the concepts of capital and capital formation;
- define the different types of capital and capital formation;
- indicate the sources of capital formation in agriculture;
- explain the role of capital formation in agriculture;
- analyse the trend in private and public capital formation in agriculture;
- discuss the complementarity between private and public capital formation in agriculture;
- outline the reasons for decline in public investment in Indian agriculture; and
- state the determinants of private capital formation in agriculture.

15.1 INTRODUCTION

Growth of any economy or sector primarily depends on three factors, namely, change in the demographic composition (expansion of workforce), capital accumulation (both physical and human) and innovation. Capital is thus one of the most crucial factors

in the growth/production process. It is a fact that during the green and post-green revolution periods, both public and private capital formation in agriculture made significant contribution to the farm sector's growth. Initially, agricultural development was mainly driven by public investment in: (i) agricultural infrastructure (like power, roads, irrigation and R&D), (ii) extension services, (iii) development of markets and storage facilities, etc. Subsequently, encouraged by their increased returns owing to improvements in infrastructure by such investments, farmers were induced to make private investment in land development, groundwater irrigation, farm mechanization, HYV seeds, chemical fertilizers, etc. More recently, private corporate sector also entered into the agricultural R&D, extension, marketing, contract farming and other agricultural related services. These investments have substantially supplemented the public investment in agriculture.

The above outline suggests that although agriculture is relatively a labour intensive activity, it also requires huge amount of fixed as well as working capital to perform various agricultural operations efficiently. In particular, timely investment is crucial as it is linked to seasonal factors like rain and weather change. While big and rich farmers usually have better access to capital inputs and enjoy the benefits of economies of scale, the poor farmers belonging to the 'small and marginal farmers' segment especially in the underdeveloped agricultural regions, face critical scarcity of capital. Further, as in most other cases, they do not have the ability to make investment in fixed assets. In view of this, any investment made by them cannot be economically viable in view of their small size of operational holdings and low investment capacity. In the face of this ground reality, how to make capital affordable to about 80 percent of small farmers is one of the key issues that need policy attention. Against this background, the present unit aims at discussing the various aspects related to capital formation in Indian Agriculture. Apart from an outline of the concepts, processes and measurement issues of capital formation, we will study about the role of capital formation, determinants of private capital formation, trends in capital formation, flow of institutional credit to agriculture, etc.

15.2 CONCEPTUAL OUTLINE

There is a distinction between the term capital and capital formation. There are also associated concepts like: fixed/working capital, public/private capital, investment, gross/net fixed capital formation, consumption of fixed capital, etc. Generation of data on capital and capital formation, and its usage, requires a clear idea about these concepts.

15.2.1 Capital

The term capital connotes those 'assets' which are used as inputs in the process of production to generate further goods and services. It is thus not the same as money but refers to assets for the generation of which 'investment' of both money and human efforts are required. A second characteristic of capital is, thus, that the asset must have been created by 'human efforts' and not available in a natural form. Thus, although land is the most important basic resource in agriculture, land itself is not considered capital. But any investment made on land development would be termed as capital as it satisfies the criteria of 'human efforts' and an 'asset' useful in the agricultural production process. Further, capital can be tangible or intangible. Tangible capital in agriculture refers to productive physical assets like tractor, irrigation pump-sets, farmhouse buildings, warehouses, inventories of inputs, etc. Intangible capital in agriculture refers to investment made in health, education and training of farm workers.

Indeed, expenditures on such aspects increases the 'human capital' base of agriculture which help the farmers to raise their productivity by adopting new technologies and farm management practices.

15.2.2 Capital Formation

Capital formation, on the other hand, is a process of building up the stock of capital. It is achieved by saving a part of current income of the economy and investing it in the making of capital goods like machines, tools, plants and equipments, transportation, storage and communication facilities, etc. An increase in the capital stock depends on the amount of new investment made in a particular asset. It is important to note that the capital assets used in production are consumed with time which depreciates its value. This is called as 'depreciation'. Hence, if the rate of capital consumption (depreciation) is lower than the rate of additional investment made in the capital, then the stock of that capital will be increasing over time. Such investments could be for the maintenance of capital assets (which increases the life span and quality of working of the assets) and/or for the purchase of new assets. Capital formation, thus, directly depends on the amount of investment made in the capital assets during a financial year. There is a conceptual difference between capital and investment. Investment is a flow concept measured over a period of time, usually during a financial year. On the other hand, capital is a stock concept measured at a point of time, usually at the end of a financial year. Note that capital formation contributes significantly to the process of economic development by: (i) helping to build the physical infrastructure; (ii) facilitating the adoption of modern production techniques and methods; (iii) improving the productive capability of workers; (iv) enabling the efficient use of natural resources; and (v) facilitating the adoption of technological changes raising as a result the farm production, productivity and income.

15.2.3 Types of Capital and Capital Formation

Capital used in agriculture can broadly be classified into two categories: (i) fixed capital and (ii) working capital. Fixed capital is that capital which lasts for more than one year. It includes the investment in farm machines such as tractor, pump-sets, and other assets like tube-wells, land development, farm building, etc. Working capital is that capital which lasts for less than one year such as expenses on seeds, fertilizers, wages to the workers, etc. Thus, capital formation in agriculture comprise of additions to the fixed capital less disposals and change in inventories. Inventories include materials and supplies meant for intermediate inputs in production and finished goods for sale (e.g. packaging). Fixed capital formation consists of net addition to fixed assets (i.e. total addition minus depreciation) in the current year. For the stock of capital to be maintained, additional investment equal to the amount of capital consumed (i.e. depreciation) should be made in that year. Fixed Capital Formation can further be classified into Gross Fixed Capital Formation (GFCF) and Net Fixed Capital Formation (NFCF). The GFCF consists of sum of all additions to the existing stock of fixed capital in the current year while NFCF refers to GFCF net of depreciation in the current year. Depreciation [i.e. consumption of fixed capital (CFC)] is calculated only for all fixed assets (tangible and intangible). In particular, CFC is not calculated for: (i) valuables that are acquired (as their value, in real terms, is not expected to decline over time); (ii) livestock; (iii) non-produced assets, such as, land, mineral or other deposits; (iv) work in progress; and (v) value of fixed assets destroyed by acts of war or major natural disasters.

Capital, on the basis of ownership, is categorised as private and public. Capital owned by local, state and central governments, such as, municipal sewage lines,

dams, power projects, roads, canals, warehouses, market-sheds etc. are public capital. Any capital owned by private individuals/companies, such as farm machinery and equipment is termed as private capital. Both public and private capital is necessary for the development of agricultural sector.

15.2.4 Sources of Capital Formation

There are two sources of capital formation: domestic and external. Domestic sources comprise of: (i) voluntary and involuntary savings, (ii) public borrowings, (iii) activation of idle resources, and (iv) deficit financing. There are two major sources of voluntary savings viz. household sector and corporate sector; the two together contributes to about 90 percent of our total savings with the 'public sector' occupying the third position accounting for the remaining 10 percent of total savings. Of these three constituents, the household sector's saving accounts for the highest (around 60 percent). As we know, the household sector's savings depends upon distribution of income and wealth in the economy, per capita income, propensity to save, availability of banking infrastructure, rate of interest, etc. It also depends on non-economic factors like savings for children's education and marriage, health and old-age security, etc. The corporate sector refers to the non-governmental private companies. Involuntary savings are mobilized by the government through instruments like taxation and compulsory savings (e.g. provident fund). Public or government borrowing refers to mobilisation of savings through issuing of bonds (e.g. infrastructure development bond). Activation of idle resources refer to engaging surplus agricultural workforce in works of productive asset creation like construction of roads, tube-wells, canals, school buildings, etc. Recall that the Lewis theory of unlimited supply of labour is based on this idea. Finally, the government can also raise capital through deficit financing which could be used to generate productive assets in the public sector.

External sources of capital formation include: (i) foreign direct investment (FDI), (ii) external government borrowings (EGBs), (iii) External Commercial Borrowings (ECBs) and (iv) development assistance from international institutions like World Bank, NRI deposits, etc. FDI inflows can be an important source of capital formation in developing countries. These inflows not only help to reduce the capital scarcity but also bring technology, management practices and trained human resource. They can also have a positive impact on the performance of domestic companies. This is particularly true when the domestic companies enter into collaboration with the foreign companies. EGBs refer to financial resources raised by the central and state governments from foreign institutions like the World Bank for the development of infrastructure like water and sanitation projects, road, health and power projects, etc. ECBs are private sector borrowings from abroad which could be used for investment purposes. All these help to increase the capital-base of the economy.

Check Your Progress 1 [answer in about 50 words using the space given]

1) Distinguish between the concepts of tangible and intangible forms of capital.

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2) Differentiate between capital and investment. In what way 'investment' is linked with 'capital formation'?

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3) State five different ways in which 'capital formation' aids economic development.

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4) Distinguish between fixed capital and working capital.

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5) Why is 'depreciation' calculated only for fixed assets? Give some examples of assets for which depreciation is not calculated.

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6) What are the two key sources of capital formation in agriculture? Which one of them can contribute to the improvement in the performance of domestic companies? How?

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15.3 SYSTEM OF ACCOUNTING FOR CAPITAL FORMATION

In India, the annual publication National Accounts Statistics (NAS) published by the Central Statistical Organization (CSO) presents data on capital formation in the Indian economy for all industrial sectors including agriculture. The CSO largely follows guidelines of the United Nations System of National Accounts (UN-SNA) which revises and improves the SNA periodically. Recently, the UN has recommended the

SNA-2008. In the CSO's current estimates, which are based on new base year 2004-05, the recommendations of SNA-2008 are incorporated to the extent of availability of data. These relate to treating R&D expenditures in public sector as capital expenditures, adopting the declining balance (of life of assets) method for estimating the consumption of fixed capital and capital stock, etc.

For the purpose of estimation of national accounts in the NAS, the economy is divided into 9 sub-sectors viz.: (i) agriculture, forestry & fishing; (ii) mining and quarrying; (iii) manufacturing; (iv) electricity, gas & water supply; (v) construction; (vi) trade, hotels & restaurants; (vii) transport, storage & communication; (viii) financing, insurance, real estate & business services; and (ix) community, social and personal services. The capital assets of these sub-sectors are valued at market prices (both at current and constant prices). In particular, the estimates of gross fixed capital formation (GFCF) are prepared separately for each of the three institutional sectors, namely, public sector, private corporate sector and household sector. The GFCF in the household sector is estimated from the data collected through various NSSO surveys. This is then inter/extrapolated with the observed growth in gross value of output or value added. Estimates of public sector GFCF are based on the annual budget documents, while data on private corporate sector GFCF are provided by the RBI.

The public sector GFCF in agriculture is mainly due to major irrigation projects undertaken by the departmental commercial undertakings. The contribution of small scale works like minor irrigation, horticulture, livestock and development of government farms is accounted for by the non-departmental commercial undertakings. For accounting purposes, expenditure made by the ministry of agriculture, rural development, etc. [on crop husbandry, soil and water conservation, preservation of wildlife and other agricultural programmes (leading to tangible or intangible assets)], is accounted for as capital formation in public administration (and not agriculture). Capital formation in the private corporate sector due to plantation activities is estimated by collecting the data from the tea, coffee and rubber boards.

In the household sector, capital formation is due to construction activities such as digging of wells/tube-wells, construction of bunds and farmhouses, etc. These are estimated by using the results of All India Debt and Investment Survey (AIDIS) conducted once in ten years. For the post-survey years, the estimates are made by projecting the base year results using the indices of rural construction and agricultural production specially computed for the purpose. Acquisition of agricultural machinery and transport equipments are estimated by extrapolating the AIDIS results by using the results of Annual Survey of Industries. Increment in livestock is estimated by extrapolating the results of livestock censuses conducted once in five years. As most of the forests are owned by the government, the estimates of capital formation for forestry is compiled from the budget documents. For fishing activities, the GFCF is estimated as net addition to capital stock comprising of the mechanised and non-mechanised fishing boats, etc. by using the results of Indian Livestock Census (ILC). Once again, for the pre/post-census years, the results are extrapolated.

15.3.1 Capital Formation <u>in</u> Agriculture and <u>for</u> Agriculture

A distinction has recently been made between capital formation *<u>in</u>* agriculture and *<u>for</u>* agriculture. This is due to an opinion among experts that capital formation in some industries/activities also benefits the farm sector and therefore a part of such capital formation should be accounted for in agriculture. In view of this, the government constituted a committee headed by Prof. B. B. Bhattacharya. The committee, in its

Table 15.1 Sector-wise Proportions of GFCF for Agriculture

Sector	Agriculture, etc.	Agricultural Machinery	Fertilizers & Pesticides	Electricity, Gas & Water Supply	Construction	Trade	Railways	Storage	Communication	Banking & Insurance
Proportion of GFCF	1.00	1.0	0.9616	0.0855	0.088	0.245	0.066	0.693	0.091	0.0525

Source: Government of India, Report of the Committee on Capital Formation in Agriculture, Ministry of Agriculture, New Delhi, 2003.

report (2004), broadened the scope of agricultural capital formation by including all those activities which indirectly helped the agricultural sector to raise its production/ productivity. Classifying the agricultural capital formation into two categories viz. capital formation in agriculture and capital formation for agriculture, the Committee estimated the proportion of GFCF of many industries which should be taken as 'GFCF for agriculture'. The industries considered for this purpose are: (i) fertilizer and pesticides, (ii) electricity/gas/water supply, (iii) construction, (iv) trade, (v) railways, (vi) storage, (vii) communications, and (viii) banking and insurance. Table 15.1 shows the proportion of GFCF estimated to be taken for agriculture in this regard. While for agriculture and agricultural machineries sectors this proportion was 1.0 (i.e. 100 percent), for fertilisers and pesticides it was highest at 0.96 (i.e. 96 percent). The proportions recommended for other sectors in descending order of their values are: storage (69.3 percent), trade (24.5 percent), communications (9.1 percent), construction (8.8 percent), electricity (8.6 percent) and banking & insurance (5.3 percent). The suggested method of adding on to the GFCF of agriculture from the capital formation in the other sectors would, thus, amount to presenting a more realistic estimate of the GFCF for the agricultural sector.

15.4 ROLE OF CAPITAL FORMATION IN AGRICULTURE

Capital and labour are the two important factors of production. To some extent, they are substitutable but to a greater extent they are complementary to each other. Both fixed capital and working capital are required for agriculture to perform its various operations in a timely and cost-effective manner. This is also needed for augmenting agricultural production and productivity by way of raising the cropping intensity, changing the cropping pattern and reducing the pre and post-harvest losses. In brief, therefore, capital formation in agriculture helps to bring technical progress by shifting the production frontier upward. It does this by providing several benefits like: (i) increase in yield; (ii) timely completion of farm operations; (iii) maximum possible land utilization; (iv) shift in the cropping pattern; and (v) diversification of agriculture. The capital formation thus facilitates to expand agricultural market as these benefits result in more marketable surplus. The market expansion, in turn, not only raises the farm income but also provides easy access to agricultural products to the consumers. In the process, it helps to ensure food security for the growing population and raw material security to the agro-based industries. Capital formation also helps in improving the quality of agricultural produce through better storage and transportation facilities. These, in turn, increases the prospects of agro-exports. India can play a major role in global market for farm products as it has a fairly large land area and large labour force under agriculture. The role of GFCF in contributing to the growth of the sector

can also be explained in terms of the types of capital in general and the complementarity that exists between the public and private capitals in particular.

Fixed Capital and Working Capital: Fixed capital comprise of investment made in machines, tools, farm building, tractor, land levellers, cultivators, harvesters, dug well & tube well, irrigation structure, tree-stock, livestock, land development, soil & water conservation harvesting structures, etc. These are assets created which would help raise the farm production, productivity and income. Likewise, working capital helps to purchase various farm inputs such as seeds, fertilizer, pesticides, irrigation water, hiring of agricultural labour, hiring of machines and draught power. Easy access to these inputs and resources is necessary for the timely performance of various agricultural operations. In other words, without access to fixed and working capitals, it would not be feasible to do farming.

Public Capital and Private Capital: It would be helpful to assess the role of capital formation in agriculture, if we classified the capital formation into two categories viz. public and private sector capital formation. Public sector capital formation comprise of investment made by central, state and local governments for creating the various tangible and intangible assets. These could be by way of: (i) land development, (ii) minor and major irrigation projects, (iii) soil and water conservation and harvesting works, (iv) afforestation, rural roads and electrification of villages, (v) agricultural research and development, farmers' training & capacity building, etc. You can see that all these investments/assets are of such a nature and magnitude which only the public investment can create. They are also of the nature of 'non-excludable public goods' for which reason alone one can argue that only the state can be expected to play this role. Private capital, on the other hand, are investment made by farmers for irrigation like wells, bore-wells, electric motors, diesel engines, tractors and other farm equipment. It also includes expenditure on land development, farm buildings etc. The working capital includes farmers' purchase of various inputs needed. Investment for agriculture would include investment made by the private companies in manufacturing farm machines, tools and other inputs, besides a certain share of investment in storage and markets. It is, therefore, clear that both public and private investment in agriculture is necessary for energizing the agricultural operations.

Complementarity Between Public and Private Capital: Public and private investment in agriculture is both complementary as well as substitutive. There are instances where an increase in public investment has led to increase in private investment in agriculture. For instance, the government investment in irrigation, roads and power projects are observed to induce private investment in agriculture. In other words, if basic agricultural infrastructure is created by the government, farmers would get incentive to invest their private capital for buying tractors and pump-sets and installing tube-wells in the canal command areas. This suggests that the complementarity effect is seen by way of induced investment by individual farmers in agriculture. On the other hand, public investment can also be considered as a substitute of private investment in agriculture. For instance, if government installs deep tube wells, especially in the canal command areas with the purpose of supplementing the surface irrigation and ensuring assured supply of irrigation water for agriculture, the farmers would not need to make their own investment in groundwater irrigation. Farmers generally make investment in fixed and working capital where they are purely in private domain, whereas public investment is done to create assets of a type that are mostly in public domain. The assets created by public investment may be used by the farming community with or without user charges. Examples of such usage can be cited in canal irrigation, soil & water conservation structures, agriculture research & extension

services, rural roads, electricity, etc. Some studies have estimated that the elasticity of private investment to public investment in irrigation and power are about 0.15. Thus, while an increase in public investment has a positive impact on private investment, there could also be situations where the private investment may increase to compensate the decline in public investments. However, such situations are unlikely to be in the larger community interest but more for private self-serving nature. In other words, asymmetry in the impact of increasing and decreasing public investment on private investment are real. Public capital is used for the larger purpose of development of new seeds, technology, inputs, agricultural services, and agricultural markets. Even though access to the new technology and inputs to the farmers is also provided by private agri-business companies and input dealers as is the case under contract farming, there can be no substitute for the larger purpose of a general kind that the public investments generate.

15.5 IMPACT OF ACCESS TO INSTITUTIONAL CREDIT ON CAPITAL FORMATION

Access to credit facilities is one of the key determinants of private capital formation in agriculture. Farmers' credit needs are met by institutional and non-institutional sources. Non-institutional sources of credit comprise of loan taken by the farmers from money lenders, input dealers, traders, relatives, etc. Institutional sources consist of commercial banks, cooperative banks, regional rural banks (RRBs) and cooperative credit societies. A majority of Indian farmers do not have access to the institutional credit and hence they mostly rely on non-institutional sources who charge very high interest rate ranging between 36-60 percent per annum. Consequently, most of the farmers come under the debt trap and find it difficult to get out of it. Of late, coupled with conditions of uncertain market trends, this has become a major reason for farmer's suicides. Although, agriculture is in the priority sector and 18 percent of total institutional credit flow is targeted for it, the bank credit to this sector has never reached this level. Ignorance of farmers, cumbersome procedures, and attitude of bank officials often restrict the farmers to get institutional credit. Banks usually avoid giving credit to farmers due to relatively higher transaction and operation costs. In case of default of payments, the procedure of recovery of bank loan is so cumbersome and complicated that it acts as a deterrent to advance loans to them.

On the basis of time period for credits, agricultural credit is classified into three categories, viz. short term, medium term and long term. The short term loan, often referred to as 'crop loan', is provided normally for a period of less than one year for purchasing seeds, manure, fertilizer, and pesticides or for meeting labour charges. It is to be repaid within one year, especially after crop harvesting. The medium-term loans are given for a period ranging from 1-5 years for purposes such as land development, purchase of livestock, farm machinery and generation of other productive assets. Long term loan is taken for fixed capital formation such as purchase of tractors, installation of tube-wells, development of land, etc. Such types of loans are taken for a period ranging from 5-20 years. As per the Situation Assessment Survey (SAS) of NSS-2003, 58 percent of the outstanding amount of loan to the farmers at all-India level was from institutional sources and the balance from non-institutional sources. Further, 58.4 percent of the total outstanding loans to the indebted farmers were taken for productive purposes.

Table 15.2 shows the trend in short term and medium/long term loans over the period 2001-11 presented for five-yearly intervals. This is because, due to year-to-year fluctuations, it is more realistic to take a look at the figures with a time lag.

Table 15.2 : Trends in Flow of Institutional Credit to Agricultural Sector

Category of credit	2000-01	2005-06	2010-11
Short term loan (% to total)	63.1	58.4	71.4
Medium/Long term (% to total)	36.9	41.6	28.6
Total (%)	100.0	100.0	100.0
Total (Rs. in crores)	52827	180485 (3.4)	446779 (2.5)

Source: Government of India (2012), State of Indian Agriculture 2011-12, Ministry of Agriculture, New Delhi.

Note: Figures within brackets denote number of times increase over the previous period.

Between the two end time points, there is an increase in the institutional credit for short term loans of farmers. This shows that the emphasis on credit has been for the purposes of input purchase and some productive assets. There is a corresponding decline in the share of credit raised for medium/long term. This trend is suggestive of either a reduced interest of farmers in the purchase of costlier assets or increased reluctance on the part of banks to provide long-term loans. In absolute terms, the increase in credits advanced has declined from 3.4 times increase over 2001-06 to 2.5 times increase over 2006-11. The decline might suggest a relatively more difficult and stressful time in the immediate preceding 5-year time period as compared to the period 2001-06. However, it also shows that the government's policy of providing short-term credit to farmers through issuing Kisan Credit Cards (KCCs) has proved effective in catering to the short-term credit needs of farmers. The long term and medium term credit constituted only 28.6 percent of total credit flow to the agriculture in 2010-11. The shift in the composition of the agricultural credit in favour of short-term credit has implications for private sector fixed capital formation in agriculture. More seriously, since the rate of interest on KCC loan is low at 7 percent per annum and there is also a provision of interest-subsidy if loan is repaid in time, some farmers especially those having large size of holdings, are reported to have availed the cheap KCC loan and use the money for advancing loans to the needy people at the relatively much higher interest rate prevailing in the informal money market. Such trends need to be curbed by strict monitoring of credit utilisation profiles in order that the process of capital formation does not suffer.

Check Your Progress 2 [answer in about 50 words using the space given]

1) Give two examples on how in the current estimates of CSO on capital formation, the recommendations of UN-SNA-2008 have been adopted?

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2) What are the three institutional sub-sectors for which the estimates of GFCF are presented separately in the NAS? On what sources are these estimates based?

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3) Why was a need felt to distinguish between 'GFCF in agriculture' and 'GFCF for agriculture'? Which are the six major sectors, other than agriculture & allied, from which a proportion of GFCF was recommended to be accounted for agriculture's GFCF?

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4) Mention the five different ways by which capital formation in agriculture helps advance the production frontier to shift upward.

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5) Mention some ways in which capital formation in agriculture can increase the prospects for agriculture exports.

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6) What factors contribute to restricting the poor farmers from availing institutional credit? State also the reasons why banks are generally reluctant to advance credit to farmers in spite of the government's policy on priority credit for agriculture.

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7) Which type of institutional credit has shown an increasing trend in the past one decade? What implication does it carry for the capital formation of agricultural sector?

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15.6 TRENDS IN GROSS CAPITAL FORMATION

Gross capital formation in agriculture (GCFA) as percent of total GCF of the economy was 20.2 percent in 1979-80. This has since fallen down steeply to just about 7.7 percent in 2009-10. By public/private sector distribution, this has resulted in a steep low in the share of public sector's GFCF in agriculture: from 54 percent in 1981-82 to 24.4 percent in 1991-92 (i.e. more than 100 percent decline) and to a further low of 14.3 percent in 2001-02. This shows that since the mid-1980s, capital formation in agriculture has been largely driven by the private sector's capital formation so much so that by the late 1990s, private investments accounted for approximately three quarters of total investments in the sector. However, in the more recent years, the share of public sector GCFA has increased from 14.3 percent in 2002-03 to 26.3 percent 2006-07 although there has once again been a decline to 18.5 percent in 2009-10. The declining share of agriculture in the total public and private sector GCF in the Indian economy reveals that the capital formation in the non-agricultural sectors grew faster than that in the agricultural sector. This is quite obvious because over a period of time, contribution of agriculture in the overall GDP of the country has also declined significantly. However, if we estimate GCFA in terms of its percentage share in the agricultural GDP, we find that GCFA as percentage of agricultural GDP has increased over a period of time.

15.6.1 Reasons for Decline in Public Sector Capital Formation

Declining share of public investment is a serious issue because it is not only critical for enhancing total factor productivity (TFP) growth but also for attracting private sector investment in the sector. Some estimates indicate that a 10 percent decrease in public investments leads to a 2.4 percent reduction in agricultural GDP. Notwithstanding this, there are several reasons for the deceleration of public investment in agriculture. Prominent among them are: (i) diversion of resources from direct investment to subsidies; (ii) increase in cost of maintenance of the existing projects; (iii) delays in completion of projects; and (iv) stagnated R&D investment. Above all, the process of macro economic contraction and the consequent reducing development role of the state, during the post-liberalisation period, is the main factor in reducing public sector investment in the farm sector. As curtailing non-plan expenditure in order to reduce fiscal deficit was difficult for the government, it opted for cutting down capital expenditure in both agriculture and social sector during 1990s. Although, the government could not succeed in bringing fiscal deficit under control, productive investment in farm sector significantly declined. Rising agricultural subsidies on food, fertilisers, credit, and other inputs crowded out the real investment in agriculture. Further, the agricultural subsidies distorted the cropping pattern, created inefficiency in resource allocation and adversely affected the agricultural sustainability.

Agriculture is a state subject. Most of the states are in severe fiscal crisis due to fiscal mismanagement and the populist measures adopted by them. The bad fiscal situation of the state governments has had adverse effect on the real investment in agriculture. The cumulative expenditure of the states on agriculture and allied activities as a percentage of total expenditure has hovered around 4-6 percent since the mid 1990s compared to 8 percent in 1980-81. Mid-term review of the 9th Plan emphasised the fact that the whole approach to agriculture in the previous decade had been directed at securing increased agricultural production through input-subsidization rather than through investment in productive fixed assets and infrastructure.

Public sector capital formation can be enhanced by targeting and downsizing the agricultural subsidies, and ploughing back the resources so generated to agricultural sector as investments in irrigation and other infrastructural activities. Selling off the public sector enterprises to partially finance the resources for agricultural investments also helps push up the public sector investment at the desired cost of minimising the inefficiency of such public sector agricultural organisations. Removing distorting subsidies would also lead to a reduction in environmental damage and an increase in the government resource mobilisation.

Some economists are of the opinion that decline of the public sector capital formation has been compensated by the increase in the private sector capital formation. However, increase in private sector capital formation would not entirely compensate the decline in the public sector capital formation as the nature of capital formation in private sector is different from that of public sector. Private sector investment is mostly made in creating capital formation in the areas of farm mechanisation, land levelling, groundwater irrigation (e.g. bore well/tube-wells), etc. while public sector investment is made to create long-term assets like: construction of dams, canals, roads, marketing yards, rural electrification, agricultural R&D, etc. These types of capital are clearly not formed by the private sector. In fact, these types of capital are required to induce more private capital formation in agriculture. For instance, rural electrification encourages the farmers to install electric-operated tube-wells. We shall take a more closer look at the determinants of private capital formation now.

15.7 DETERMINANTS OF PRIVATE CAPITAL FORMATION IN AGRICULTURE

There are several factors affecting the private investment in agriculture. Important among them are: (i) terms of trade and flow of institutional credit, (ii) public sector investment in agricultural infrastructure, (iii) agricultural subsidies, (iv) flow of technology, (v) increase in size of operational holdings, etc. Favourable terms of trade to agriculture would increase the profitability in agriculture and encourage the farmers to spend more in GCF.

As discussed earlier, access to institutional credit to the farmers at cheaper rate of interest is one of the key determinants of both fixed and working capital formation in the farm sector. Public sector investment in irrigation, power, road, markets, soil and water conservation, agricultural R&D, extension, etc. induces the private investment in agriculture as such public investments are complementary to private investment. Although in general, subsidies could have negative impact on private investment, agricultural subsidies on tractors, pump sets, fertilizers, electricity, diesel, etc. have positive impact on the private sector capital formation in agriculture. Likewise, while the rising agricultural subsidies adversely affects the public GCFA and increases inefficiency in the resource allocation, these subsidies induce the farmers to purchase more capital assets and thus raise the private GCFA.

Technological advancement in agriculture also positively affects the private capital formation in agriculture. The new technologies adopted in agriculture during green and post-green revolution periods have been more capital intensive when compared to the traditional technology.

Rising number of operational holdings due to division of holdings are likely to increase the GCFA, as division of holdings increases the demand for investment in farm assets and machinery. The number of operational holdings in India has increased from 97.2 million in 1985-86 to 120.82 million in 2000-01, an addition of 23.66 million holdings.

The availability of institutional credit and subsidies to the farm sector motivates these divided holdings to increase investment in farm machinery. Several empirical studies have established that terms of trade for agriculture and institutional credit to farmers have positive and significant impact on private capital formation at national level. Two inferences that can be drawn from these factors are:

a) since public investment in key agricultural infrastructures has positive impact on private capital formation, the government should increase the public investment in irrigation, power, road, market, R&D, etc. to encourage private investment in agriculture; and

b) terms of trade for agriculture may be improved through subsiding inputs. This suggests that agricultural subsidies should not be completely phased out but rationalised and effectively targeted.

Check Your Progress 3 [answer questions 2 to 5 in about 50 words using the space given]

1) Fill in the blanks.

   a) The GCFA (gross capital formation in agriculture) as percentage of total GCF has declined from ..... percent (p.c.) in 1979-80 to ..... p.c. in 2009-10.

   b) The share of public sector's GCFA has steeply declined from ..... p.c. in 1981-82 to ..... p.c. in 1991-92 and ..... p.c. in 2001-02.

   c) In more recent years, the share of public sector's GCFA has increased from ..... p.c. in 2002-03 to ..... p.c. in 2006-07 but has once again slid down to ..... p.c. in 2009-10.

2) Mention the five important reasons for the deceleration of public investment in agriculture.

   .....

   .....

   .....

   .....

3) On what ground is it argued that private sector's GCFA cannot be a compensating factor for the decline in the public sector's GCFA?

   .....

   .....

   .....

   .....

4) Mention the five important factors which affect the private investment in agriculture.

   .....

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5) Going by the different factors that determine the private sector's GCFA, what two major inferences can be drawn on the required policy emphasis?

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15.8 LET US SUM UP

Although agriculture is relatively a labour intensive activity, it also requires both fixed and working capitals to perform various operations efficiently. Capital consists of those assets produced (which can be both tangible as well as intangible) which are used as inputs in the production process to generate further goods and services. Capital formation is a process of building up the stock of capital by saving a part of the current income and investing it in creating capital goods/assets. During the production process, a part of fixed asset is consumed; this is called as depreciation. If the rate of consumption of a fixed asset is lower than the rate of investment in the asset, then the stock of that fixed asset will increase.

Capital in agriculture is formed by both public and private sectors. Public sector capital formation consists of investment in agricultural infrastructure such as minor and major irrigation projects, R&D and extension services, rural roads, electrification of villages, etc. Private capital formation comprise of investment made by the farmers in farm machines, tube-wells, field channels, land development and other productive assets and inputs. Both public and private capital formation is necessary for energizing the Indian agriculture.

Trends in GCFA since 1960-61 show that GCFA as percentage of total GCF of the economy has declined after 1980s. The decline in the extent of public sector GCFA was so steep that the share of public sector GCFA to the total GCFA has sharply declined from 54 percent in 1981-82 to 14.3 percent in 2001-02. Although it has since increased to 26.3 percent in 2006-07, it is still a matter of serious issue as increase in the private sector GCFA cannot compensate the damaging effect of lower public sector GCFA. This emphasises the importance of identifying the causes for declining share of public sector investment in agriculture and taking corrective policy measures to augment the public investment in agriculture.

15.9 KEY WORDS

Capital Accumulation : Refers to the stock of capital asset over a period when the rate of depreciation in the asset is lower than the rate of investment made in it.

Tangible Capital : Refers to the productive physical assets such as tractor, farmhouses, tube-wells, diesel engines, etc.

Intangible Capital : It consists of non-material assets that contribute to agricultural output such as investment in workers' education, training and health, etc.

Fixed Capital : Refers to that capital which lasts for more than one year, such as farm building, tractor, pump-sets, etc.

Working Capital : Refers to that capital which lasts less than one year, such as expenses on purchase of seeds, fertilizers, etc.

Capital Consumption : Refers to that part of fixed capital which is consumed while producing output during the current year. It is also known as depreciation.

Institutional Credit : It refers to the credit/loan provided by the financial institutions, such as commercial banks, cooperative banks and region rural banks.

15.10 SUGGESTED REFERENCES FOR FURTHER READING

Chand, Ramesh (2000), *Emerging Trends and Regional Variations in Agricultural Investments and their Implications for Growth and Equity*, Policy Paper, National Centre for Agricultural Economics and Policy Research, New Delhi.

Govt of India (2012), *State of Indian Agriculture 2011-12*, Ministry of Agriculture and Cooperation, New Delhi.

Gulati, A and Bathla, S. (2002), *Capital Formation in Indian Agriculture: Trends, Composition and Implications for Growth,* Occasional Paper 24, NABARD, Mumbai.

15.11 ANSWERS/HINTS TO CYP EXERCISES

Check Your Progress 1

1) See 15.2.1 and answer.

2) See 15.2.1 and answer.

3) See 15.2.2 and answer.

4) See 15.2.3 and answer.

5) See 15.2.3 and answer.

6) See 15.2.4 and answer.

Check Your Progress 2

1) See 15.3 and answer.

2) See 15.3 and answer.

3) See 15.3.1 and answer.

4) See 15.4 and answer.

5) See 15.4 and answer.

6) See 15.5 and answer.

7) See 15.5 and answer.

Check Your Progress 3

1) a) See 15.6 and answer; b) See 15.6 and answer; c) See 15.6 and answer.

2) See 15.6.1 and answer.

3) See 15.6.1 and answer.

4) See 15.7 and answer.

5) See 15.7 and answer.